450

2014 SERVICE MANUAL [ATV]

ARCTIC CAT®

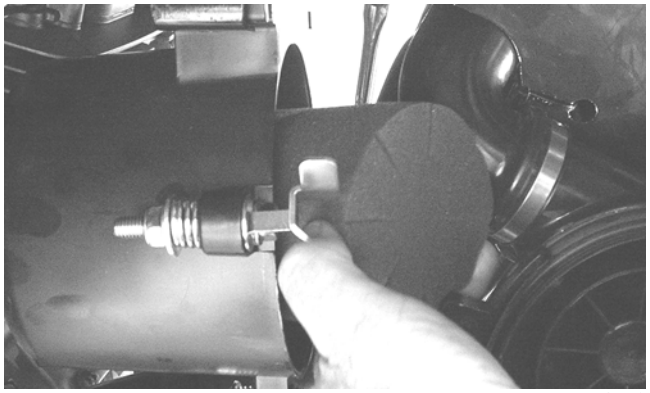
Lubrication Points

It is advisable to lubricate certain components periodically to ensure free movement. Apply light oil to the components using the following list as reference.

A. Throttle Lever Pivot/Cable Ends

B. Brake Lever Pivot/Cable Ends

C. Auxiliary Brake Cable Ends

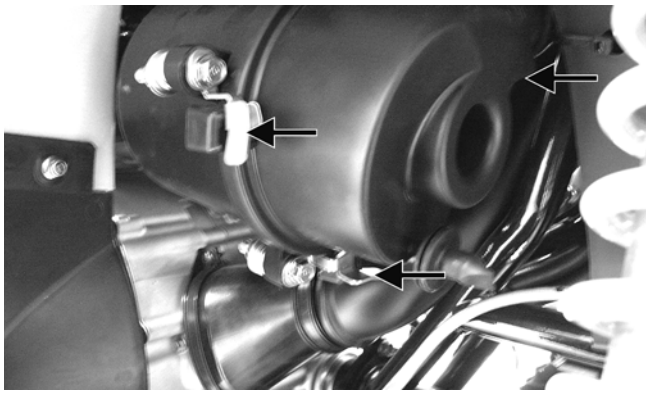


KC148

Air Filter

CLEANING AND INSPECTING FILTER

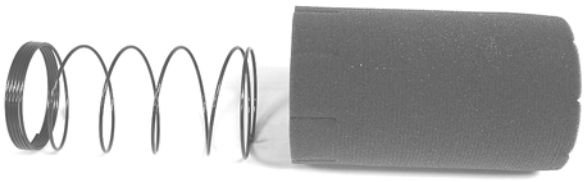
1. Rotate the three locking tabs free of the lugs on the air filter cover; then rotate the cover forward and away from the filter housing.



KC0056A

KC147

2. Remove the foam filter element from the air filter housing and separate the foam element from the spring.



KC143

3. Fill a wash pan larger than the element with a non-flammable cleaning solvent; then dip the element in the solvent and wash it.

■NOTE: Foam Air Filter Cleaner and Foam Air Filter Oil are available from Arctic Cat.

4. Dry the element.

5. Put the element in a plastic bag; then pour in air filter oil and work the oil into the element. Insert the forming spring into the element with the closely wrapped end of the spring toward the open end of the element.

CAUTION

A torn air filter element can cause damage to the ATV engine. Dirt and dust may get inside the engine if the element is torn. Carefully examine the element for tears before and after cleaning it. Replace the element with a new one if it is torn.

6. Clean any dirt or debris from inside the air cleaner.

7. Place the filter assembly in the air filter housing making sure it is properly positioned and properly seated with the filter element straight in the housing.

4. Carefully check the entire hydraulic brake system that all hose connections are tight, the bleed screws are tight, the protective caps are installed, and no leakage is present.

CAUTION

Brake fluid that has been drained or bled from the brake system must NEVER be re-used or severe brake system corrosion and damage may occur. Always discard used brake fluid in an appropriate manner.

CAUTION

This hydraulic brake system is designed to use DOT 4 brake fluid only. If brake fluid must be added, care must be taken as brake fluid is very corrosive to painted surfaces.

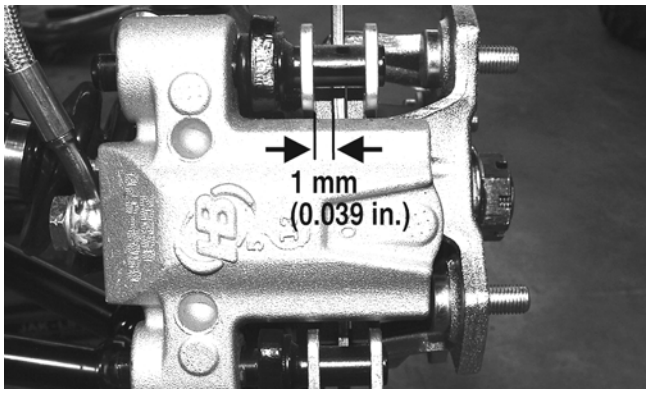
INSPECTING HOSES

Carefully inspect the hydraulic brake hoses for cracks or other damage. If found, the brake hoses must be replaced.

CHECKING/REPLACING PADS

The clearance between the brake pads and brake discs is adjusted automatically as the brake pads wear. The only maintenance that is required is replacement of the brake pads when they show excessive wear. Check the thickness of each of the brake pads as follows.

1. Remove a front wheel.
2. Measure the thickness of each brake pad.
3. If thickness of either brake pad is less than 1.0 mm (0.039 in.), the brake pads must be replaced.



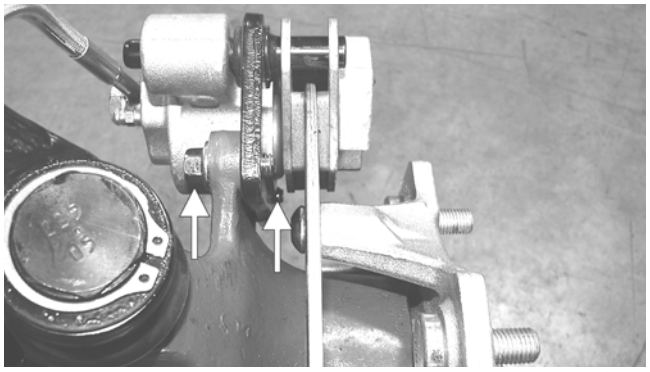
PR376B

■**NOTE: The brake pads should be replaced as a set.**

4. To replace the brake pads, use the following procedure.
   A. Remove the cap screws securing the caliper to the knuckle; then remove the pads.

PR237

   B. Install the new brake pads.
   C. Secure the caliper to the knuckle and/or axle housing with the cap screws with “patch-lock”. Tighten to 20 ft-lb.



PR377B

5. Install the wheel. Tighten to 40 ft-lb (steel) or 80 ft-lb (aluminum).
6. Burnish the brake pads.

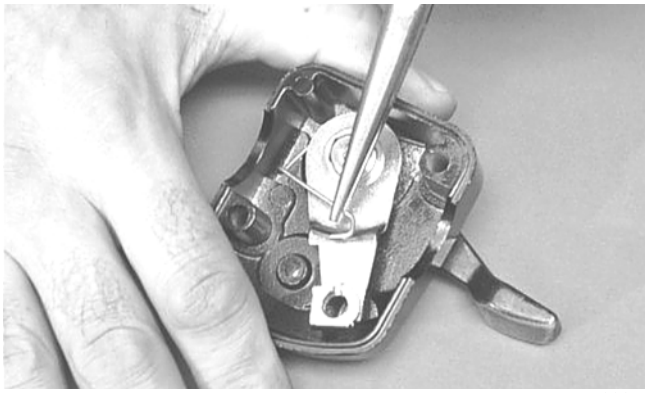
Burnishing Brake Pads

Brake pads (both main and auxiliary) must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished. To properly burnish the brake pads, use the following procedure.

⚠ WARNING

Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

1. Choose an area large enough to safely accelerate the ATV to 30 mph and to brake to a stop.
2. Accelerate to 30 mph; then compress brake lever or apply the auxiliary brake to decelerate to 0-5 mph.
3. Repeat procedure on each brake system twenty times.
4. Adjust the auxiliary brake (if necessary).
5. Verify that the brakelight illuminates when the hand lever is compressed or the brake pedal is depressed.



AF680D

3. Place the two halves of the throttle control onto the handlebar and secure with the two machine screws.

ADJUSTING

To adjust throttle cable free-play, see Periodic Maintenance - Adjusting Throttle Cable.

Steering Knuckles

REMOVING AND DISASSEMBLING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.
3. Remove the nut securing the hub.
4. Remove the brake caliper.
5. Remove the hub assembly.
6. Remove the cotter pin from the tie rod end and remove the tie rod end from the knuckle.
7. Remove the two cap screws securing the ball joints in the knuckle.
8. Tap the ball joint end out of the knuckle; then remove the knuckle.
9. Remove the snap ring from the knuckle; then remove the bearing.

PR287A

PR288

CAUTION

Use extreme care when removing the bearing. If the bearing is allowed to fall, it will be damaged and will have to be replaced.

CLEANING AND INSPECTING

1. Clean all knuckle components.
2. Inspect the bearing for pits, gouges, rusting, or premature wear.
3. Inspect the knuckle for cracks, breaks, or porosity.
4. Inspect threads for stripping or damage.

ASSEMBLING AND INSTALLING

1. Install the bearing; then install the snap ring making sure it seats into the knuckle.

PR287A

2. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 35 ft-lb.

Top-Side Components

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to removed from the frame for this procedure.**

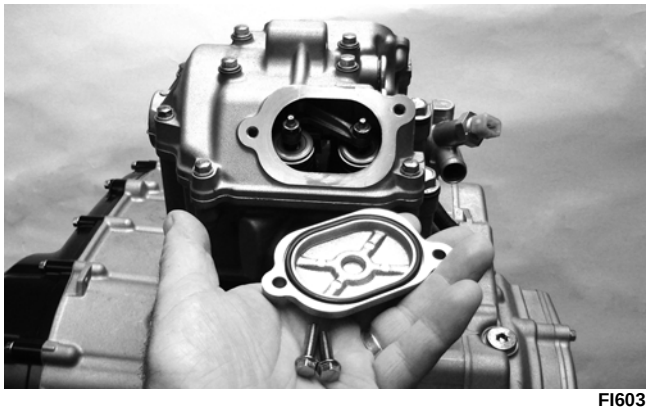
Removing Top-Side Components

A. Cylinder Head Cover/Rocker Arms
B. Cylinder Head/Camshaft

■**NOTE: Remove the spark plug, timing inspection plug, and outer magneto cover; then using an appropriate wrench, rotate the crankshaft to top-dead-center of the compression stroke.**

■**NOTE: Arctic Cat recommends the use of new gaskets, lock nuts, and seals and lubricating all internal components when servicing the engine/transmission.**

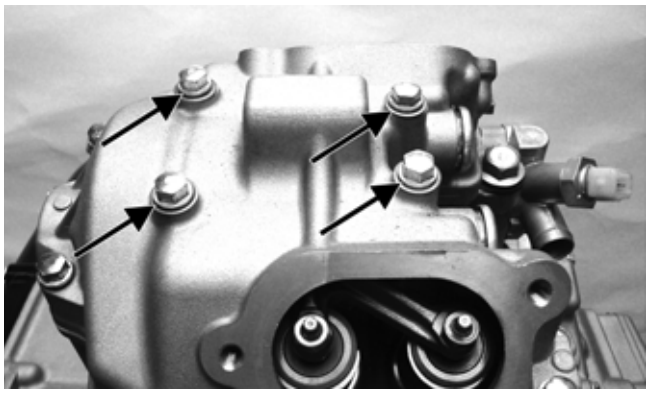
1. Remove the cap screws securing the two valve inspection covers. Remove the two covers. Account for the O-rings.



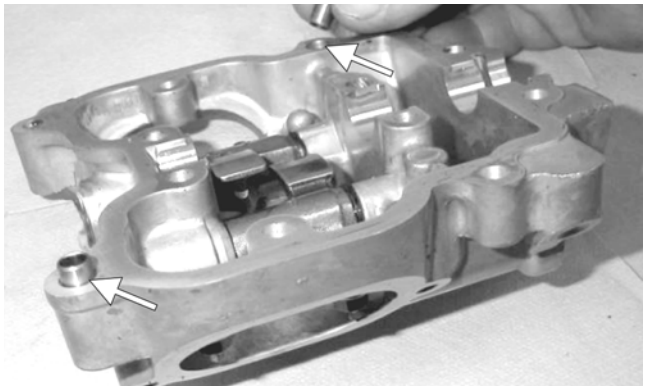
FI603

■**NOTE: Keep the mounting hardware with the covers for assembly purposes.**

2. Remove the cylinder head cover cap screws. Note the rubber washers on the four top-side cap screws; remove the cylinder head cover. Note the orientation of the cylinder head plug and remove it. Note the location of the two alignment pins.

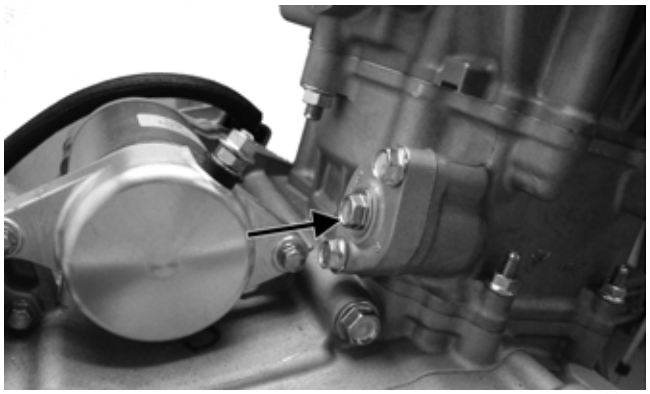


FI606A



MD1354A

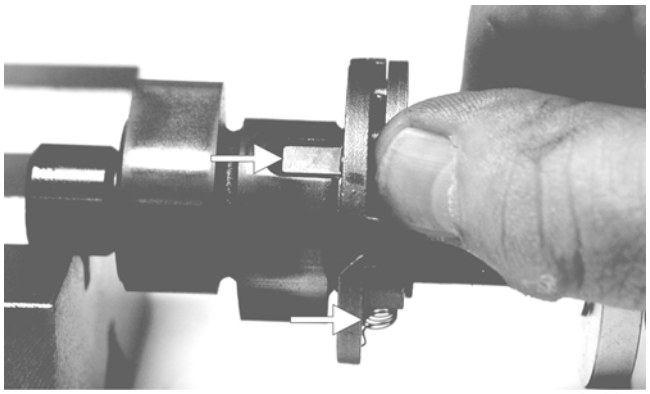
3. Remove the cap screw from the tension adjuster; then using a common screwdriver, relax the cam chain tension by rotating the adjuster screw clockwise until it locks.



FI607A

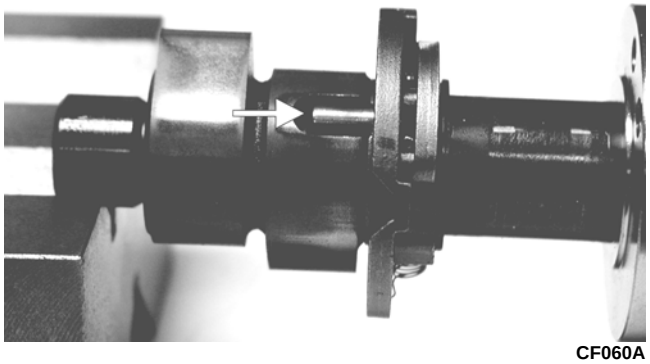
Inspecting Camshaft Spring/Unloader Pin

1. Inspect the spring and unloader pin for damage.



CF061A

■**NOTE: With the weight extended, the unloader pin should be flat-side out; with the weight retracted, the unloader pin should be round-side out.**



CF060A

2. If damaged, the camshaft must be replaced.

Installing Top-Side Components

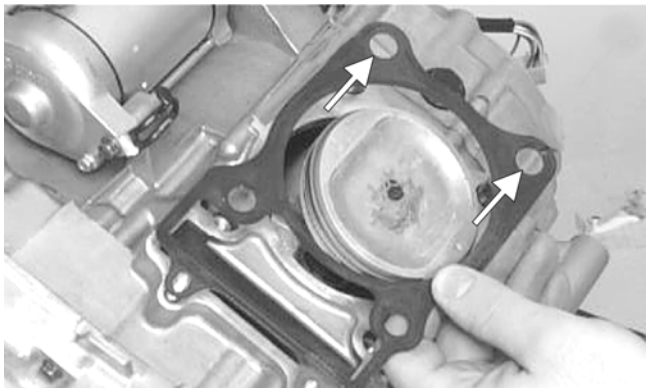
A. Piston
B. Cylinder

1. Lubricate the piston pin, connecting rod, and piston pin bore with motor oil; then install the piston on the connecting rod making sure there is a circlip on each side.

■**NOTE: The piston should be installed so the IN points towards the intake.**

FI626

2. Place the two alignment pins into position. Place a new cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

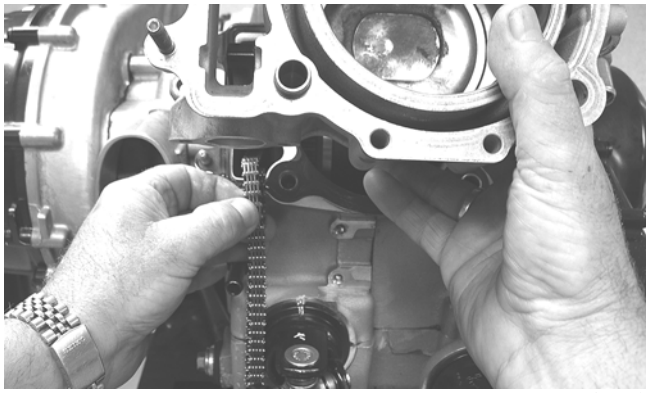


MD1344

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

CAUTION

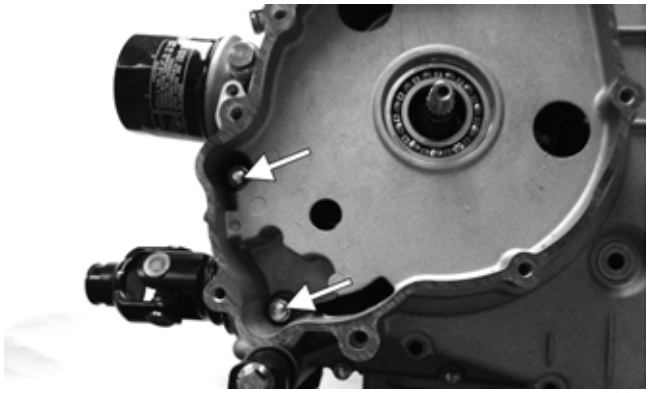
The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.



GZ142

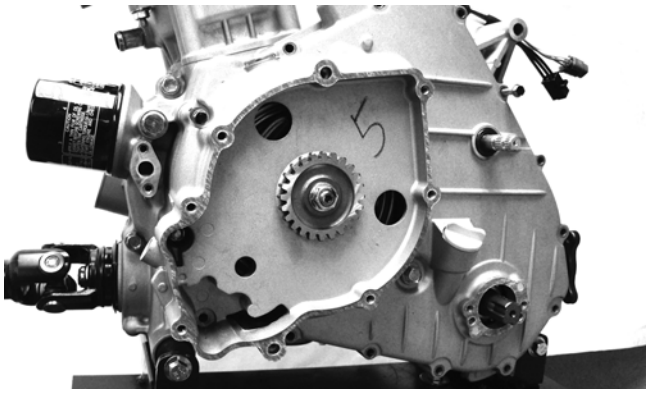
4. Loosely install the two nuts securing the cylinder to the right-side crankcase half.

■**NOTE: The two cylinder-to-crankcase nuts will be tightened in step 9.**



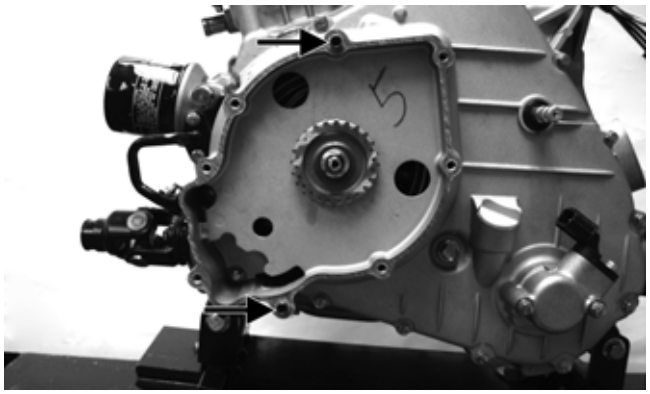
FI596A

10. Install the water pump drive gear and secure with the nut. Tighten to 28 ft-lb.

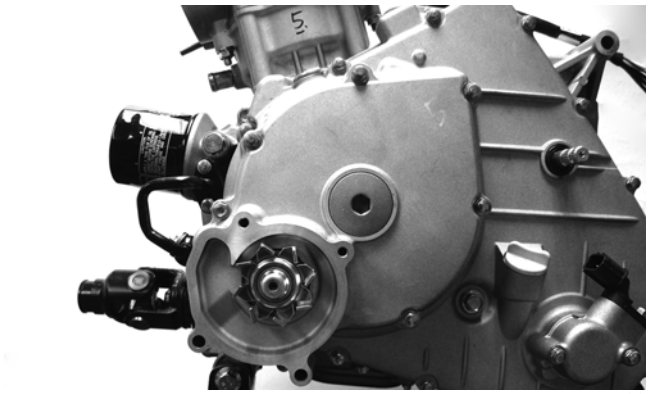


FI547

11. Install two alignment pins and a gasket on the magneto cover; then install the water pump housing assembly. Tighten the cap screws to 8 ft-lb.

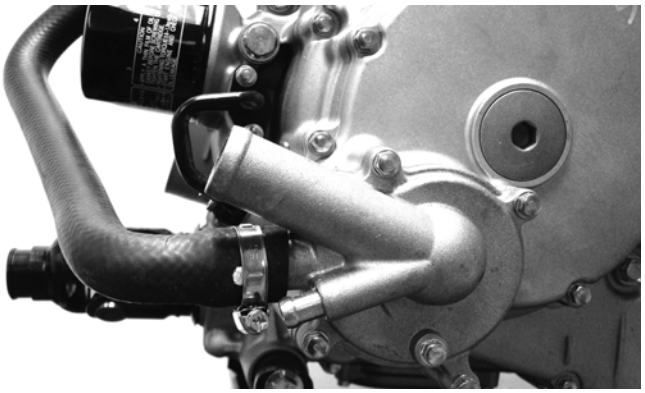


FI541A



FI539

12. Install the water pump cover with a new O-ring and secure with the four cap screws. Tighten to 8 ft-lb.



FI538

13. Connect the coolant hoses to the water pump and secure with the hose clamps. Tighten securely.

Right-Side Components

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Right-Side Components.

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT

To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

Removing Right-Side Components

A. V-Belt Cover
B. Driven Pulley
C. Clutch Cover

1. If the engine is still in the frame, remove the cap screw securing the brake pedal to the pivot shaft. Account for a flat washer.

Checking Backlash

■NOTE: The rear shaft and bevel gear must be removed for this procedure. Also, always start with the original shims on the rear shaft.

1. Place the left-side crankcase cover onto the left-side crankcase half to prevent runout of the secondary transmission output shaft.
2. Install the secondary driven output shaft assembly onto the crankcase.
3. Mount the indicator tip of the dial indicator on the secondary driven bevel gear (centered on the gear tooth).
4. While rocking the driven bevel gear back and forth, note the maximum backlash reading on the gauge.
5. Acceptable backlash range is 0.05-0.33 mm (0.002-0.013 in.).

Correcting Backlash

■NOTE: If backlash measurement is within the acceptable range, no correction is necessary.

1. If backlash measurement is less than specified, remove an existing shim, measure it, and install a new thinner shim.
2. If backlash measurement is more than specified, remove an existing shim, measure it, and install a thicker shim.

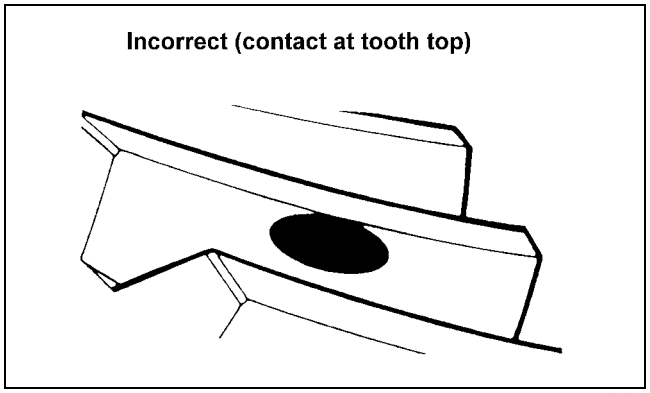
■NOTE: Continue to remove, measure, and install until backlash measurement is within tolerance. Note the following chart.

Backlash Measurement	Shim Correction
Under 0.05 mm (0.002 in.)	Decrease Shim Thickness
At 0.05-0.33 mm (0.002-0.013 in.)	No Correction Required
Over 0.33 mm (0.013 in.)	Increase Shim Thickness

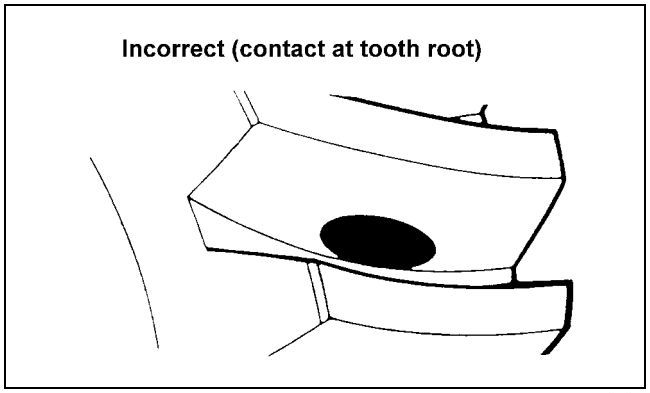
Checking Tooth Contact

■NOTE: After correcting backlash of the secondary driven bevel gear, it is necessary to check tooth contact.

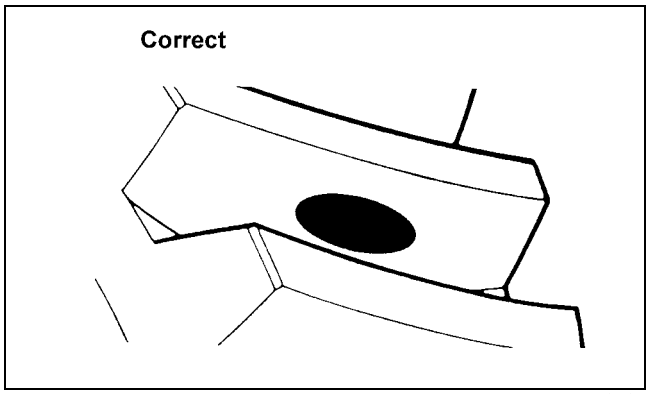
1. Remove the secondary driven output shaft assembly from the left-side crankcase half.
2. Clean the secondary driven bevel gear teeth of old oil and grease residue.
3. Apply a thin, even coat of a machinist-layout dye to several teeth of the gear.
4. Install the secondary driven output shaft assembly.
5. Rotate the secondary driven bevel gear several revolutions in both directions.
6. Examine the tooth contact pattern in the dye and compare the pattern to the illustrations.



ATV-0103



ATV-0105



ATV-0104

Correcting Tooth Contact

■NOTE: If tooth contact pattern is comparable to the correct pattern illustration, no correction is necessary.

If tooth contact pattern is comparable to an incorrect pattern, correct tooth contact according to the following chart.

Tooth Contact	Shim Correction
Contacts at Top	Decrease Shim Thickness
Contacts at Root	Increase Shim Thickness

Throttle Cable Free-Play

To adjust throttle cable free-play, see Periodic Maintenance.

Gas Tank

⚠ WARNING

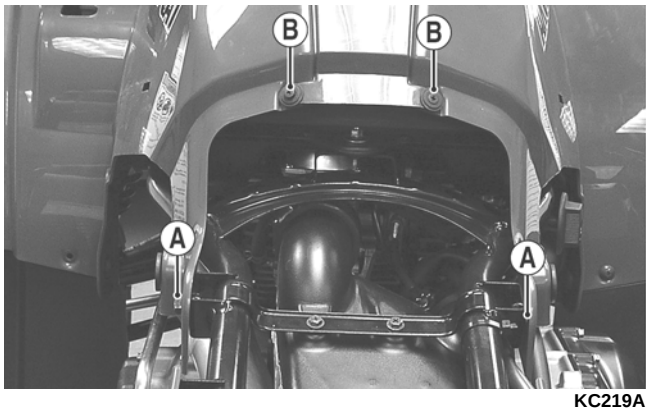
Whenever any maintenance or inspection is made on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

REMOVING

1. Disconnect the negative battery cable; then remove the seat and side panels.
2. Remove the cap screws securing the instrument pod and move it forward.

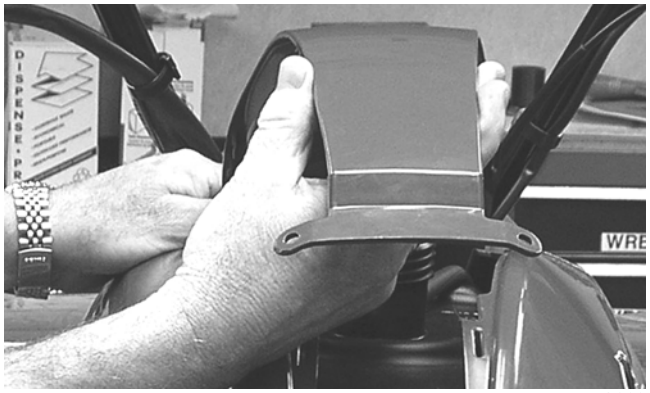
KC507A

3. Remove the cap screws (A) securing the rear of the front body to frame; then remove two reinstallable rivets (B) securing the gas tank cover to the body.



KC219A

4. Remove the gas tank cap; then remove the gas tank cover. Place the gas tank cap back on the tank.



KC220

5. Using suitable straps, hook the plastic at rear of gas tank and route it over the handlebar to the front rack; then pull it tight to spread open the plastic at the rear of the gas tank. This will aid in removing and installing gas tank.

KC509A

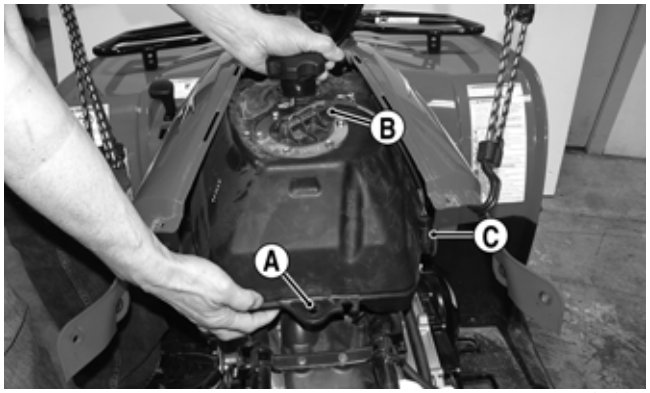
6. Remove the cap screw (A) securing the gas tank to the frame; then disconnect the gasline hose (B) and fuel pump (C). Remove the gas tank to the rear. Account for the heat shield.

⚠ WARNING

Do not turn the ignition switch to the ON position with the hoses removed. Gasoline will be pumped by the electric fuel pump causing a safety hazard.

⚠ WARNING

Gasoline may be under pressure. Place an absorbent towel under the connector to absorb any gasoline spray when disconnecting.



KC509B

2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.
3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, motor, or the main wiring harness.

■NOTE: If the meter shows battery voltage, the main wiring harness is good. The connector should be checked for resistance.

RESISTANCE (Fan Motor Connector)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the red wire; then connect the black tester lead to the black wire.
3. The meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

■NOTE: To determine if the fan motor is good, connect the blue wire from the fan connector to the positive side of a 12 volt DC power supply; then connect the black wire from the fan connector to the negative side. The fan should operate.

⚠ WARNING

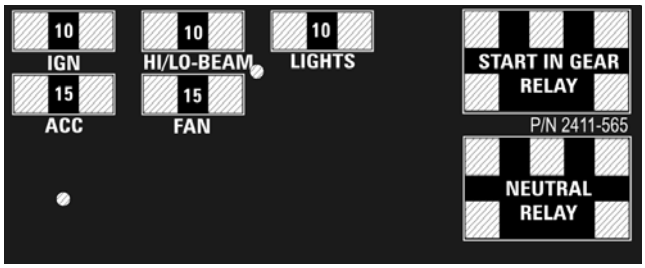
Care should be taken to keep clear of the fan blades.

Fuse Block/Power Distribution Module

The fuses are located in a power distribution module in front of the steering post. In addition, there is a 30 amp fuse on the starter relay under the seat next to the battery.

If there is any type of electrical system failure, always check the fuses first.

■NOTE: To remove a fuse, compress the locking tabs on either side of the fuse case and lift out.



2411-565

CAUTION

Always replace a blown fuse with a fuse of the same type and rating.

KC210A

■NOTE: The ignition switch must be in the LIGHTS position.

1. Remove all fuses from the distribution module.
2. Set the meter selector to the DC Voltage position.
3. Connect the black tester lead to ground.
4. Using the red tester lead, contact each end of the fuse holder connector terminals individually.
5. The meter must show battery voltage from one side of the connector terminal ends.

■NOTE: Battery voltage will be indicated from only one side of the fuse holder connector terminal; the other side will show no voltage.

■NOTE: When testing the HI fuse holder, the headlight dimmer switch must be in the HI position; when testing the LIGHTS fuse holder, the headlight dimmer switch can be in either position.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, switches, distribution module, or the main wiring harness.

CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one spade end of the fuse; then connect the black tester lead to the other spade end.
3. The meter must show less than 1 ohm resistance. If the meter reads open, replace the fuse.

■NOTE: Make sure the fuses are returned to their proper position according to amperage. Refer to the fuse block cover for fuse placement.

RELAYS

The relays are identical plug-in type located on the power distribution module. Relay function can be checked by switching relay positions. The relays are interchangeable.

■NOTE: The module and wiring harness are not a serviceable component and must be replaced as an assembly.

FI672

3. Using a multimeter, connect the black tester lead to the black socket (GND) on the analyzer and the red tester lead to the white socket (VAR); then select the DC Voltage position. With the vehicle off, the gauge should read 0.66-0.70 and at Wide-Open Throttle it should read up to approximately 3.88.

FI673A

EFI Diagnostic System

DIGITAL GAUGE

The digital gauge can be used as a diagnostic tool for many of the DTC's displayed. To place the gauge into the diagnostic mode, use the following procedure.

1. Turn the ignition switch ON.
2. Depress and hold both Mode and Set buttons together for approximately 10 seconds after which the letters "dIAg" will appear on the LCD momentarily followed by COOL.

EFI002A

■NOTE: The display on the gauge will display in SAE (speedometer in MPH mode) or Metric (speedometer in km/h mode), For example to read temperature in degrees Celsius, select km/h mode on the gauge or to read Fahrenheit, select MPH mode.

3. Cycle the display by depressing either the Set or Mode button to step to the desired function.

EFI004

■NOTE: The gauge can be utilized dynamically (engine running/vehicle moving) or statically (engine/vehicle stopped).

Examples of Static checks: Battery voltage, fuel gauge/sensor, and TPS (0% @ closed throttle, 95-100% @ WOT).

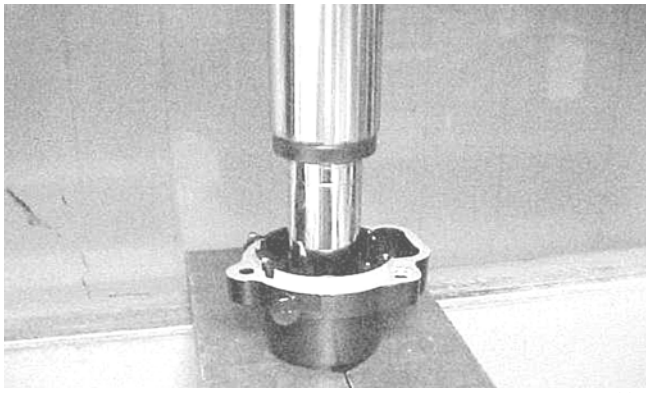
EFI007

Examples of Dynamic checks: Battery charging, coolant temperature including fans ON/OFF (see below), MAP/IAT, tachometer, and speedometer signal.

AF982

6. Remove the snap ring securing the input shaft bearing; then place the pinion housing in a press and remove the bearing.

AF983

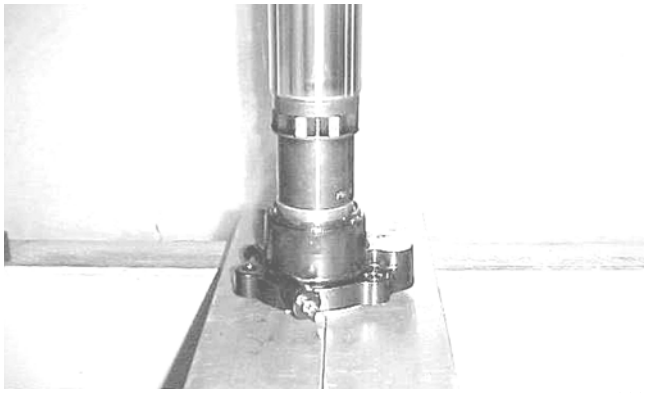


AF984

KX219

Assembling Input Shaft

1. Place the pinion housing in a press and install the input shaft bearing. Secure the bearing with the existing snap ring making sure the sharp edge of the snap ring faces to the outside.



AF993

AF994

2. Install the input shaft seal making sure it is flush with the edge of the housing.
3. Lubricate the input shaft splines with High-Performance #2 Molybdenum Disulphide Grease.

■NOTE: Any time drive splines are separated, clean all splines with parts-cleaning solvent and dry with compressed air; then lubricate with recommended grease.

KX221

INSTALLING

1. Slide the gear case into position through the left side of the frame; then secure it to the frame with cap screws and lock nuts. Tighten to 38 ft-lb.
2. Secure the engine output flange to the rear gear case input flange with four cap screws and lock nuts. Tighten to 20 ft-lb.
3. Install the rear drive axles.

Hub

REMOVING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the cotter pin from the nut.

■NOTE: During assembly, new cotter pins should be installed.

3. Remove the flange nut securing the hub.
4. Remove the brake caliper.

KC283

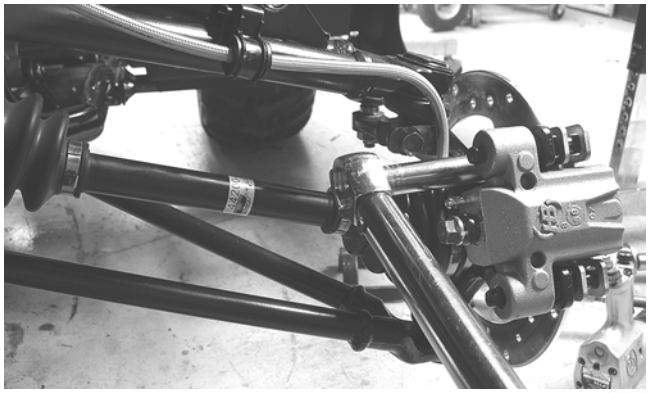
5. Remove the hub assembly.
6. Remove the four cap screws securing the brake disc.

CLEANING AND INSPECTING

1. Clean all hub components.
2. Inspect all threads for stripping or damage.
3. Inspect the brake disc for cracks or warping.
4. Inspect the hub for pits, cracks, loose studs, or spline wear.

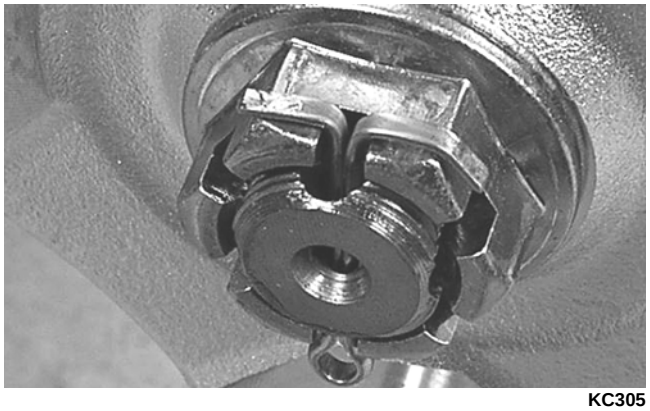
INSTALLING

1. Secure the brake disc to the hub with the four cap screws coated with blue Loctite #243. Tighten to 15 ft-lb.
2. Apply grease to the splines in the hub.
3. Install the hub assembly onto the shaft.
4. Secure the hub assembly with the nut. Tighten only until snug.
5. Secure the brake caliper to the knuckle with the two “patch-lock” cap screws. Tighten the caliper to 20 ft-lb.



KC283

6. Tighten the hub nut (from step 4) to 200 ft-lb; then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



KC305

7. Install the wheel and tighten to 40 ft-lb (steel) or 80 ft-lb (aluminum).
8. Remove the ATV from the support stand.

Hand Brake Lever/Master Cylinder Assembly

■NOTE: The master cylinder is a non-serviceable component; it must be replaced as an assembly.

REMOVING

1. Slide a piece of flexible tubing over one of the wheel bleeder valves and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain completely.

■NOTE: Compressing the brake lever several times will quicken the draining process.